Message

From: Hubbard, Carolyn [Hubbard.Carolyn@epa.gov]
Sent: 2/10/2021 2:53:06 PM
To: Orme-Zavaleta, Jennifer [Orme-Zavaleta.Jennifer@epa.gov]; Frey, Christopher [Frey.Christopher@epa.gov]; Rodan, Bruce [rodan.bruce@epa.gov]; D'Amico, Louis [DAmico.Louis@epa.gov]
Subject: FW: Upcoming publication on fossil fuel PM and global mortality

Hi- FYI on this publication from a grantee. A draft statement is below in case we get any questions. I haven't seen any yet.

Carolyn Hubbard
Communications Director
EPA Office of Research and Development
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Proposed response on background:

Ex. 5 Deliberative Process (DP)

From: Keating, Terry
Sent: Monday, February 8, 2021 12:42 PM
To: Sauerhage, Maggie <Sauerhage.Maggie@epa.gov>; Hubbell, Bryan <Hubbell.Bryan@epa.gov>
Cc: Hunt, Sherri <Hunt.Sherri@epa.gov>; Shatas, Angie <Shatas.Angie@epa.gov>; Serena Chung (chung.serena@epa.gov) <chung.serena@epa.gov>; Blank, Valerie <Blank.Valerie@epa.gov>; Settineri, Max <Settineri.Max@epa.gov>
Subject: Upcoming publication on fossil fuel PM and global mortality

Maggie and Bryan,

I received an email this morning from folks at the Harvard/MIT ACE Center giving us a heads up that a paper will be coming out tomorrow (2/9) that credits partial funding from EPA. The paper entitled "Global mortality from outdoor fine particle pollution generated by fossil fuel combustion: Results from GEOS-Chem" will appear in the journal Environmental Research. The authors estimate that fossil fuel related PM2.5 was responsible for 8.7 million deaths in 2018, an estimate that is twice that of the most recent Global Burden of Disease study. The accepted draft of the paper and a draft press release from Harvard are attached.

The study is primarily funded by the Wallace Global Fund and the lead author of the paper is from the University of Birmingham (United Kingdom). The fact that some EPA funding contributed to this work was discovered by the ACE Center leads late. Therefore, EPA funding is acknowledged in the Harvard press release (draft attached), but is not acknowledged in the version of the paper that will appear online initially. The final version of the paper will include an acknowledgement of EPA funding through the ACE Center grant.

The citation and abstract for the paper are as follows:

Vohra, Karn, Alina Vodonos, Joel Schwartz, Eloise A. Marais, Melissa P. Sulprizio, and Loretta J. Mickley (2021) Global mortality from outdoor fine particle pollution generated by fossil fuel combustion: Results from GEOS-Chem. Environmental Research.

The burning of fossil fuels – especially coal, petrol, and diesel – is a major source of airborne fine particulate matter (PM2.5), and a key contributor to the global burden of mortality and disease. Previous risk assessments have examined the health response to total PM2.5, not just PM2.5 from fossil fuel combustion, and have used a concentration-response function with limited support from the literature and data at both high and low concentrations. This assessment examines mortality associated with PM2.5 from only fossil fuel combustion, making use of a recent meta-analysis of newer studies with a wider range of exposure. We also estimated mortality due to lower respiratory infections (LRI) among children under the age of five in the Americas and Europe, regions for which we have reliable data on the relative risk of this health outcome from PM2.5 exposure. We used the chemical transport model GEOS-Chem to estimate global exposure levels to fossil-fuel related PM2.5 in 2012. Relative risks of mortality were modeled using functions that link long-term exposure to PM2.5 and mortality, incorporating nonlinearity in the concentration response. We estimate a global total of 10.2 (95% CI: -47.1 to 17.0) million premature deaths annually attributable to the fossil-fuel component of PM2.5. The greatest mortality impact is estimated over regions with substantial fossil fuel related PM2.5, notably China (3.9 million), India (2.5 million) and parts of eastern US, Europe and Southeast Asia. The estimate for China predates substantial decline in fossil fuel emissions and decreases to 2.4 million premature deaths due to 43.7% reduction in fossil fuel PM2.5 from 2012 to 2018 bringing the global total to 8.7 (95% CI: -1.8 to 14.0) million premature deaths. We also estimated excess annual deaths due to LRI in children (0 - 4 years old) of 876 in North America, 747 in South America, and 605 in Europe. This study demonstrates that the fossil fuel component of PM2.5 contributes a large mortality burden. The steeper concentration-response function slope at lower concentrations leads to larger estimates than previously found in Europe and North America, and the slower drop-off in slope at higher concentrations results in larger estimates in Asia. Fossil fuel combustion can be more readily controlled than other sources and precursors of PM2.5 such as dust or wildfire smoke, so this is a clear message to policymakers and stakeholders to further incentivize a shift to clean sources of energy.

A key driver of the high estimate of PM2.5 health effects is a concentration-response function developed by Joel Schwartz's group at Harvard with funding from the Wallace Global Fund. This concentration-response function was published in an earlier paper:

Vodonos, Alina, Yara Abu Awad, and Joel Schwartz (2018). The concentration-response between long-term PM2.5 exposure and mortality; A meta-regression approach. Environmental Research 166: 677–689, https://doi.org/10.1016/j.envres.2018.06.021

Please let me know if you need further information.

Terry

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